Name:

at1124exam: Radicals and Squares (v921)

Question 1

Simplify the radical expressions.

$\sqrt{98}$	$\sqrt{8}$	$\sqrt{27}$
$\sqrt{7 \cdot 7 \cdot 2}$	$\sqrt{2 \cdot 2 \cdot 2}$	$\sqrt{3 \cdot 3 \cdot 3}$
$7\sqrt{2}$	$2\sqrt{2}$	$3\sqrt{3}$

Question 2

Find all solutions to the equation below:

$$6\left((x-10)^2-7\right) \;=\; 54$$

First, divide both sides by 6.

$$(x-10)^2-7=9$$

Then, add 7 to both sides.

$$(x-10)^2=16$$

Undo the squaring. Remember the plus-minus symbol.

$$x-10=\pm 4$$

Add 10 to both sides.

$$x=10\pm 4$$

So the two solutions are $x=14$ and $x=6$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 10x = -16$$

$$x^2 - 10x + 25 = -16 + 25$$
$$x^2 - 10x + 25 = 9$$
$$(x-5)^2 = 9$$
$$x - 5 = \pm 3$$
$$x = 5 \pm 3$$
$$x = 8 \quad \text{or} \quad x = 2$$

Question 4

Any quadratic function, with vertex at (h, k), can be expressed in vertex form:

$$y = a(x-h)^2 + k$$

A quadratic function is shown below in standard form.

$$y = 2x^2 - 20x + 56$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 - 10x) + 56$$

We want a perfect square. Halve -10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 - 10x + 25 - 25) + 56$$

Factor the perfect-square trinomial.

$$y = 2((x-5)^2 - 25) + 56$$

Distribute the 2.

$$y = 2(x-5)^2 - 50 + 56$$

Combine the constants to get **vertex form**:

$$y = 2(x-5)^2 + 6$$

The vertex is at point $(5, 6)$.